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FOREST PEST CONDITIONS IN THE NORTHEAST '73

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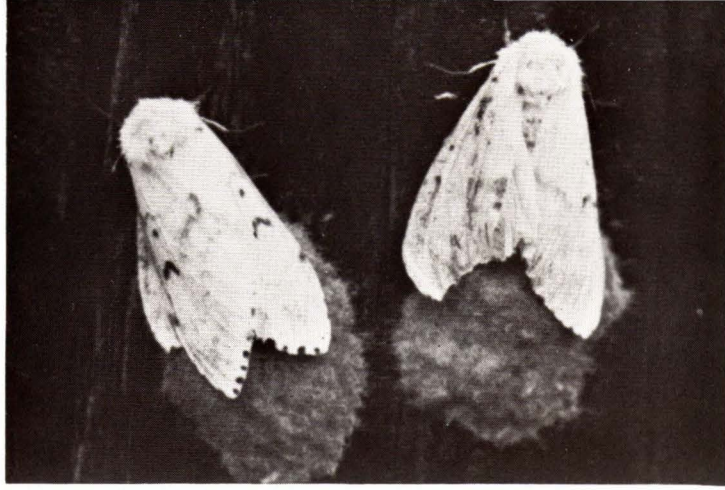
Includes forest lands in Illinois, Indiana, Iowa, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Vermont, West Virginia, and Wisconsin.

CONDITIONS IN BRIEF

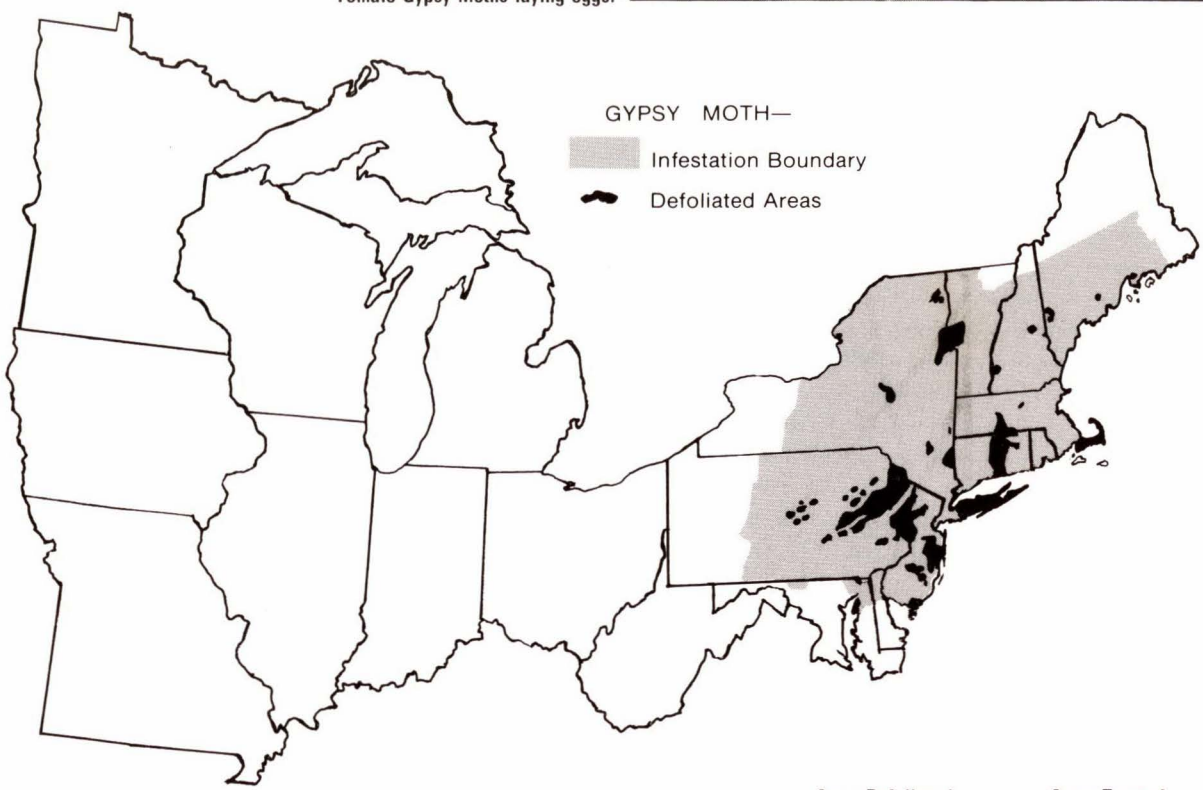
Unlike most previous years no new important outbreaks of forest insects were detected in the Northeast during 1973. However, there were continued expansions of defoliator problems. The gypsy moth spread throughout Pennsylvania, popped up in an unexplained place in Northern Ohio and is threatening to become established in lower Michigan. Overall, nearly 1.8 million acres were defoliated. In an effort to limit its impact approximately 175,000 acres were aerially sprayed. Known parasites of the gypsy moths were released in Maryland, West Virginia and Wisconsin as a measure for lessening the impact of the pest when it becomes established. The spruce budworm is present on many of the important balsam fir producing sites in the Lake States. Salvage cutting and other stand manipulations are being practiced to manage these populations. In Maine about 450,000 acres, or 20%, of the defoliated area was treated with Zectran. Egg mass and damage surveys indicate another 430,000 will need treatment in 1974. The cherry scallop shell moth was rapidly expanding in the major cherry-producing regions of Pennsylvania. Damaging populations were also present in Maryland, Massachusetts, New York, West Virginia, and Vermont. No suppression measures were undertaken, but field tests with Gardona are anticipated for next year. In Michigan severe defoliation caused by the large population of hardwood defoliators, including the variable oakleaf caterpillar and the red-humped oakworm, decreased noticeably from 392,000 acres in 1972 to 60,000 acres in 1973. Promising insecticides were field tested. A change in weather conditions probably has been the greatest single factor in the decline of larch sawfly and the forest tent caterpillar problems in the Lake States forests and the southern pine beetle outbreak in Delaware and Maryland.

Disease causing organisms were mostly static and caused no great havoc; however, Dutch elm disease continued its spread through the timber stands of the Lake States. Current suppression techniques are still not suitable under forest conditions. Oak wilt has not been a problem within its wide range except in dense oak stands where severe infections spread through root grafts. Red pine tip blight and *Scleroderris* canker, two newer Lake States disease problems, intensified in local situations but spread little. Lophodermium needlecast was common in many Christmas plantings where Spanish and French varieties of Scotch pine were most severely effected. State nurseries in Pennsylvania also destroyed infected seedlings. Anthracrose was reported from most states, largely due to a prolonged wet spring. Fortunately, the impact on forest stands is minimal. White pine blister rust is still a limiting factor in eastern white pine management; genetically resistant stock is under development in Forest Service seed orchards in Wisconsin. Millions of board feet of beech wood are being destroyed annually by the beech bark disease. It has now reached stands in the western part of New York.

STATUS OF INSECTS



Female Gypsy Moths laying eggs.



GYPSY MOTH

Porthetria dispar (L.)

Infestations have exploded this year in Pennsylvania, with the entire state now considered infested. Here, gypsy moth feeding caused moderate to heavy defoliation on an estimated 857,000 acres; more than double the acreage defoliated in 1972. This upward trend in population has been occurring in the Northeast since 1968. Overall nearly 1.8 million acres were defoliated in 1973, up 25% from 1972, as shown in the following tabulation:

States	Acres Defoliated 1972	Acres Defoliated 1973	Acres Treated 1972	Acres Treated 1973
Connecticut	513,880	333,215	–	3,527
Maine	40	490	–	–
Massachusetts	20,480	43,970	–	–
New Hampshire	200	30	–	–
New Jersey	226,140	254,865	47,412	47,881
New York	177,605	248,441	43,000	15,715
Pennsylvania	404,060	856,710	24,800	39,610
Rhode Island	22,150	35,925	58,968	67,773
Vermont	4,215	200	–	–
Total acreage	1,369,130	1,773,846	174,180	174,506

The pest also appeared, inexplicably, outside the quarantine area in Ohio, where a one-acre infestation was located in Richfield, near Cleveland; and in a woodlot in Isabella County, near the central part of Lower Michigan.

GPO 806–182–2

Devastation by Gypsy Moth of picnic area in July in northeastern Pennsylvania.

Control of gypsy moth has been subject to considerable controversy, since the impact of defoliation on the host, people and environment has not been clearly measurable. Current treatment efforts are not aimed at limiting the spread and eradicating populations of the pest but rather are used to protect the benefits man derives from trees such as shade, temperature, wind and noise level reduction, and privacy.

Approximately 175,000 acres were treated in the cooperative state-federal program. Three registered insecticides—carbaryl, trichlorfon and *Bacillus thuringiensis*, a biological chemical, were used successfully. Disparlure, a male sex attractant, used as a confusing agent to reduce mating, was applied on 16,000 acres in Massachusetts. Preliminary results were promising.

In an effort to eliminate an isolated outbreak in Central Lower Michigan, nearly 14,000 acres were aerially sprayed with carbaryl by USDA, Animal and Plant Health Inspection Service. Follow-up surveys are underway to determine the extent and severity of this outbreak.

To detect expanding populations, states surrounding and adjacent to Pennsylvania continue to monitor the influx of gypsy moth, using the disparlure-baited traps. This year new male catches were recorded in the Northeastern Area in two counties of Illinois, one of Ohio and 17 of West Virginia. In Central Lower Michigan, moths were trapped in 18 counties surrounding the three counties where successful trapping occurred in 1972.

Pennsylvania continued to rear and release gypsy moth parasites in 1973. Of 17,449 parasites released, *Brachymeria intermedia* comprised 55% of the total. West Virginia released 19,081 *B. intermedia* in areas where the fall cankerworm, saddled prominent, cherry scallop, shell moth and orange-humped mapleworm could serve as alternate hosts. Establishment of the parasite may lessen the impact of the impending invasion of the gypsy moth into the state. Maryland and Wisconsin also reported release of parasites.

Populations are expected to vary within states next year with a considerable increase in Massachusetts and a general spread south and west of the currently infestated area. Nearly 375,000 acres are tentatively scheduled for treatment by states in 1974.

Close up of Spruce Budworm

SPRUCE BUDWORM

Choristoneura fumiferana (Clemens)

The spruce budworm in Northern Maine covered about 2,500,000 acres; all in Aroostook, Penobscot and Washington Counties. In Washington County and on offshore islands, tremendous flights of spruce budworm moths were observed in July. Gravid female moths were depositing large numbers of egg masses on building surfaces. In general, egg mass counts were extremely high in areas untreated.

In June, a Federal-State-Private suppression project on 450,000 acres of State and Private woodlands were sprayed with Zectran at a rate of 0.15 lbs./gal./acre. Results indicated substantial foliage protection. Larval population was reduced over 90% in treated areas. Egg mass and damage surveys indicate 430,000 acres need treatment in 1974.

In the Lake States, damaging populations of spruce budworm are still present on about 500,000 acres in

Northeastern Minnesota, on 15,000 acres in Northeastern Wisconsin, and are scattered in Upper Michigan. Little expansion of outbreak boundaries occurred this season. Chemical suppression has been absent for several years since control efforts by States and National Forests are moving in the direction of stand manipulation and utilization. Improvement in the wood market has helped this situation. Increased defoliation is anticipated for Northern Wisconsin in 1974.

Devastation by Spruce Budworm defoliation purposely left unsprayed to show what would happen without control.

JACK-PINE BUDWORM

Choristoneura pinus (Freeman)

Budworm larval counts in Northwestern Wisconsin were the lowest in several years and little defoliation was noted throughout the jack pine type. Larval and pupal parasitism were evident and further reduced populations. Egg counts were generally low and no severe defoliation is anticipated anywhere in the State in 1974.

In Michigan, about 1,000 acres of light defoliation was noted on the Upper Peninsula; populations on the Huron-Manistee National Forest were on the increase. Only low levels of population were present in Minnesota jack pine stands. No change is expected in 1974.

CHERRY SCALLOP SHELL MOTH

Hydria prunivorata (Ferguson)

Larval populations caused extensive defoliation of black cherry in Pennsylvania for the third consective year. The 1972 infestation doubled in size with heavy defoliation on 130,000 acres and light to moderate defoliation on 213,000 acres.

In New York, approximately 10,000 acres were defoliated, compared to 250,000 acres in 1972, Maryland reported light to moderate defoliation on 100 acres and West Virginia indicated scattered defoliation on 500 acres. Massachusetts and Vermont populations were down from last year.

The U.S. Forest Service Insecticide Evaluation Project at Berkeley, California, conducted a screening test for an effective chemical to control this pest. Preliminary results indicate Gardona is the most practical effective insecticide. Malathion was non-toxic at the highest dosage level.

SARATOGA SPITTLEBUG

Aphrophora saratogensis (Fitch)

Damage by and populations of this insect were much higher in 1973 than 1972 in Eastern Maine. Approximately 4,000 acres of red pine plantations were infested; 2,000 acres were treated with malathion. There was a continued decrease in damage by this insect in the Lake States.

FALL WEBWORM

Hyphantria cunea (Drury)

This unsightly pest is reported increasing in the States of Missouri, Pennsylvania and West Virginia. Pennsylvania reported the heaviest infestations occurring in the southwest portion of the State. West Virginia reported complete defoliation on 500 acres and Missouri is predicting scattered moderate to heavy defoliation on a statewide basis in 1974. Ohio reported a decrease in population level from 1972. Ornamental and shade trees were defoliated in the New England States. Potential outlook for next year is continued high population.

VARIABLE OAK LEAF CATERPILLAR

Heterocampa manteo (Doubleday)

Defoliation of oak and other hardwoods by this caterpillar in association with the red-humped oakworm and yellow-necked caterpillar was reported from many locations in west central and northwest Wisconsin. The largest single area of infestation was reported on 6,000 acres of scrub oak. *H. manteo* is beginning to dominate the defoliator complex in Lower Michigan.

LARCH SAWFLY

Pristiphora erichsonii (Hartig)

Nearly every stand of larch growing in the northern half of New Jersey was severely defoliated (60-100%) by the larch sawfly. About 5,200 acres of larch was defoliated in New York, with the overall population stable. On poor sites, larch mortality is occurring after five consecutive years of defoliation. The population is severe in North Central Wisconsin. Flooding of bogs may have reduced the presence of this pest in Minnesota. Upper Michigan reported low populations and no observable damage. No suppression was undertaken.

RED-HUMPED OAKWORM

Symmerista canicosta (Franclemont)

Approximately 42,000 acres of white oak were moderate to severely defoliated by this insect in Eastern Connecticut. Population levels are also high in Southern Rhode Island, where a serious problem is expected next year.

After three years of increasing population in a hardwood defoliator complex the red-humped oakworm is diminishing on the Huron-Manistee National Forest in Michigan. Approximately 60,000 acres showed severe defoliation in 1973; noticeably less than last year's 400,000 acres. A small field test of three pesticides indicated carbaryl was the most effective in reducing the larval population.

OAK LEAF ROLLER AND TIERS

Croesia albicomana (Clemens)

Increasing populations of the leaf rollers on trees in the red oak group was observed in three central New Jersey counties. In Rhode Island, there was a decline in the population after relatively high levels since 1969.

Noticeable defoliation in Pennsylvania is down to about 113,000 acres, while Southeastern West Virginia showed about 200,000 acres with feeding damage. In Eastern Central Wisconsin, a severe population has contributed to dieback and mortality on 4,500 acres of red oak and 8,000 acres of pin oak. Intermediate and suppressed trees were most susceptible.

Defoliation of Norway Spruce.

WHITE PINE WEEVIL

Pissodes strobi (Peck)

Surveys for white pine weevil indicated populations increased in Northwestern Wisconsin, especially in young jack pine stands. Damage also appears to be greater than in recent years in west central counties where an estimated 5% of the tops were weeviled in some areas of jack pine reproduction, and up to 20% top killing occurred in some white pine and Norway spruce plantations. The pest is becoming major in Rhode Island; population levels and damage incidence are on a downward trend for the third consecutive year in New Hampshire.

LARGE ASPEN TORTRIX

Choristoneura conflictana (Walker)

Damage by this insect was present throughout the Upper Peninsula of Michigan, Northern Wisconsin, Northeastern Minnesota and Northwestern Maine; almost everywhere the host occurred. Moths were so numerous in some locations, they covered exterior walls of buildings and were several inches deep beneath street lights. In general, defoliation ranged from light to moderate. However, scattered small areas of heavy defoliation occurred. No measurable effects of defoliation have been determined. High populations are expected next year.

FALL CANKERWORM

Alsophila pometaria (Harris)

Moderate to heavy defoliation on 10,000 acres in 1973 was reported by Pennsylvania, while West Virginia reported 2,200 acres of heavy to complete defoliation. A large area in Elk Neck State Forest, Maryland, was reported infested and parasite release work has been conducted in this area. The population is declining in Rhode Island. In New Jersey, carbaryl was used to effectively treat 365 acres.

HEMLOCK LOOPER

Lambdina athasaria athasaria (Walker)

Approximately 2,500 acres of hemlock was defoliated in Essex, the northeastern part of Massachusetts, Damage appeared to be confined to mature stands. Control measures were undertaken by private landowners, using malathion at a rate of 1 lb./acre. The population has declined considerably in southeastern Massachusetts and Rhode Island. Increased activity by the hemlock looper in western Pennsylvania caused moderate to heavy defoliation on 5,200 acres.

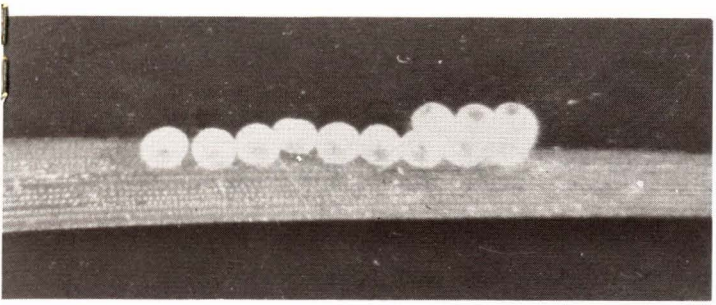
FOREST TENT CATERPILLAR

Malacosoma disstria (Hubner)

The forest tent caterpillar population collapsed in Pennsylvania in most areas, however, maple mortality is evident on 2,800 acres previously infested by this pest. A low level population exists in Minnesota. Surveys reveal about one egg mass for ten trees. Weather extremes during the early larval stages are suspect to population control.

BARK BEETLES

Bark beetles were active in balsam fir which was severely defoliated by spruce budworm in Northeastern Wisconsin. Bark beetles also attacked weakened coniferous trees in low-lying areas in west central Wisconsin which had been flooded during April, May and June. Some build-up also occurred following a five-week-long dry period in July and August.



Egg masses of Pitch Pine Looper

PINE LOOPER

Lambdina athasaria pellucidaris (G. & R.)

On Cape Cod and vicinity, several thousand acres of pitch pine were visibly defoliated by this insect. At Otis Air Force Base, Massachusetts, the U. S. Air Force treated 13,000 acres of pitch pine with malathion. Local towns aerially treated several thousand acres with carbaryl. Results of the spray operations indicate good control.

RED PINE SCALE

Marsucoccus resinosae (Bean and Godwin)

Although no new outbreaks of red pine scale were found this year, control work continued on existing infestations in the Wanaque Reservoir, Passaic County and Bergen County, New Jersey. In New York, the red pine scale infestation has increased considerably over last year and was detected for the first time in Rockland County. Much of the red pine in the vicinity of Long Island and extreme southeast part of New York are now infested.

MISCELLANEOUS INSECTS

BALSAM WOOLLY APHID, ***Adelges piceae*** **(Ratz.),** caused tree mortality in coastal regions of Maine and on 13,000 acres in Northern Vermont. Oak ridgetop sites in Union County, Pennsylvania, were heavily infested with the pit-making oak scale, *Asterolecanium variolosum* (Ratz.). The orange-striped oakworm, *Anisota senatoria* (J. E. Smith), is increasing in Rhode Island after six years at a low level. In Pennsylvania about 30,000 acres were defoliated by the green-striped mapleworm, *Anisota rubicunda* (F.), with scattered defoliation reported throughout West Virginia.

Next year's outlook for the fall webworm, *Hypantria cunea* (Drury), is continued high populations in Maine, Massachusetts, New Hampshire, Rhode Island and Vermont. The satin moth, *Stilpnotia salicis* (L.), was moderate to severe on about 6,000 acres in North Central Maine where heavy defoliation occurred in the late 1960's. Eastern tent caterpillar, *Malacosoma americanum* (F.), populations collapsed in Pennsylvania and West Virginia while light defoliation was noted throughout Southern Missouri. Sugar maple defoliation caused by the Bruce spanworm, *Operophtera bruceata* (Hulst), was again common and widespread in Northern Maine; an increasing population was noted in Central Vermont. In Northern Vermont larvae of the linden looper, *Erannis tiliaria* (Harr.), defoliated approximately 150,000 acres of hardwoods. Bagworm, *Thyridopteryx ephemeraeformis* (Haw.) continues to cause damage to conifers in Illinois, Missouri, Ohio and West Virginia. Surveys in Vermont for the maple leaf cutter, *Paraclemensia acerifoliella* (Fitch), indicated defoliation on 50,850 acres of sugar maple; heavy feeding also occurred in western counties of New Hampshire. Attempts of Christmas tree growers to control severe infestations of the balsam gall midge, *Dasinuera balsamicola* (Lint.), in young plantings in Wisconsin produced poor results. Red-headed pine sawfly, *Neodiprion lecontei* (Fitch), is increasing in Vermont plantations; extensive defoliation occurred on white pine in Massachusetts and on jack pine in Minnesota. Excessive rain may have been responsible for the decline of the jack pine sawfly, *N. pratti banksianae* (Rohwer), outbreak which has persisted for the past ten years. The loblolly pine sawfly, *N. taedae linearis* (Ross), reportedly caused moderate to heavy defoliation throughout southwestern portions of West Virginia, widespread but limited defoliation in Pennsylvania, and no damage in Illinois. A 20,000 acre infestation of the red-pine sawfly, *N. nanulus nanulus* (Schedl.), in Wisconsin collapsed. Feeding of the birch leaf miner, *Fenusa pusilla* (Lepelatier), caused extensive browning in New Hampshire, Vermont, Rhode Island, Central Wisconsin and the Upper Peninsula of Michigan. *F. ulmi* (Sundevall), the elm leaf miner, heavily infested elms in Central Wisconsin. The tip moth, Rhyaciona adana (Heinrich), infested about 15% of red pine nursery stock at Watersmeet, Michigan.

STATUS OF DISEASES

DUTCH ELM DISEASE, *Ceratocystis ulmi* (Buisman) Moreau. This widespread vascular disease is now present in 70 of Wisconsin's 72 counties and has appeared in many areas of Upper Michigan, a dramatic increase in the past two years. Devastation continues in the New England states. Control measures, such as sanitation, root pruning and spraying are applicable in urban areas but not under Forest conditions. Salvage of infected trees in upland areas and liquidation of merchantable elm on bottomland sites appear to be the most suitable actions for the present.

OAK WILT, *Ceratocystis fagacearum* (Bretz) Hunt. Oak wilt continues to be a problem throughout most of the NA States. West Virginia reported about a 5% increase in diseased trees which is within the normal annual variance. The fungus continues to kill large numbers of oak in Central Wisconsin where root grafting is common in sense stands. Unusual numbers of white and bur oaks were killed in Wisconsin.

RED PINE SHOOT BLIGHT, *Sirococcus strobilinus* (Pruess). This disease of red pine in the Lake States has spread little from the 1972 survey. Surveys indicate a general increase in tree killing in infected stands.

SCLERODERRIS CANKER, *Scleroderris lagerbergii* (Grem). Young red pine stands in northern Wisconsin continue to be infected with Scleroderris canker. Branch mortality is usually confined to the lower whorls. Red pine growing on poor sites, under highly stressed con-

ditions, again sustained mortality. Site selections appear to be the best control. Local spread was noted in the Adirondack Region of New York. Nursery stock at Watersmeet, Michigan, is being treated with chlorothalanil to meet sanitation standards.

LOPHODERMIUM NEEDLECAST, *Lophodermium pinastri* (Schrad ex Hook) Chev. Lophodermium needlecast was found on approximately 1,200 acres of Scotch pine Christmas tree plantations in Central Wisconsin. A survey of the principle Christmas tree producing area in Minnesota indicated about one-third of the stands were moderately to severely infected. Spanish and French varieties of Scotch pine were most severely affected. Growers treated approximately 700 acres. Pennsylvania destroyed about 355,000 infected seedlings in state nurseries. West Virginia reported needlecast on Scotch pine to be statewide.

ANTHRACNOSE, *Gnomonia* spp., *Gloeosparium* spp. and others. An increased occurrence of anthacnose was noted this year, resulting from a prolonged wet spring. It was reported in most states with occasional, complete defoliation. Red maple, sycamore and black walnut were severely affected; however, there is little concern in the forest areas.

WHITE PINE BLISTER RUST, *Cronartium ribicola* (Fisch). White pine blister rust continues to be reported along the Pocahontas-Greenbrier County line in eastern West Virginia. Control work is limited to Ribes eradication. In the Lake States, pathological and silvicultural pruning are combined to protect stands growing in the high rust hazard zone. Rust-resistant selections of eastern white pine are now being tested in the Oconto Seed Orchard, Nicolet National Forest, Wisconsin.

BEECH BARK DISEASE caused by a sequence of the beech scale, *Cryptococcus fagi* (Baer.), followed by infection with the bark fungus *Nectria coccinea* var. *faginate* (Loh.), continued its annual destruction of millions of board feet of American beech in the New England States and spread into New York and Pennsylvania. In New York, the disease took a big jump to Allegheny County. On National Forests in Vermont and New Hampshire, beech is now managed as an undesirable species largely because of beech bark disease. Stands are being salvaged with regeneration aimed at maple and birch.

DIPLODIA TWIG BLIGHT, *Diplodia* spp. This disease occurred from northern Vermont to New Jersey on hard pines. It is particularly severe on Austrian pine in New Jersey where it has affected nursery seedlings but is most damaging on mature trees. Uninfected trees over one foot in diameter are rare, with mortality frequent within five years of initial infection. Because of this severity, forest pest authorities are advising against further planting of Austrian pine.

ASPEN SHOOT BLIGHT AND LEAF SPOT, *Venturia* spp. Shoot blight and leaf spot caused by the same fungus was prevalent in most aspen stands in Wisconsin and was particularly damaging in newly regenerated clearcuts. Many trees acquired a bronze color by late August and the leaves fell prematurely. Shoot blight appears to be a major cause of forking in young aspen stands.

AIR POLLUTION. Tip burn and chlorosis of pines resulting from sulfur dioxide (SO_2) and ozone (O_3) pollution was reported in Pennsylvania and West Virginia. In Pennsylvania, SO_2 pollution was widespread with an increase of ten times the damage reported in 1972. In the north central part of the state, 70% of the white pines were affected, with mortality apparent in mature stands. A ten-day air stagnation period over Mt. Alto, Pennsylvania, caused tip burn of current needles, chlorotic mottling and permature needle drop of selected Virginia pine nursery stock; Norway spruce was also effected.

West Virginia reported SO_2 pollution causing severe tip burn on about three million seedlings in the State nursery. On the National Forests in Missouri, about 400 acres of oak showed leaf burn symptoms from sulfuric acid mist and SO_2 emissions in the vicinity of a lead mine.

WHITE PINE ROOT DECLINE, *Verticicladiella procera* (Kend.), is reported to have reached damaging proportions in many widely scattered Christmas tree plantations in West Virginia. Root rot caused by *Fomes annosus* Fr. (cke.), remains severe in many conifer plantations of Southern New England and mid-Atlantic States. Low vigor red spruce of merchantable size are being killed by the shoestring root rot fungus, *Armillaria mellea* Vahl ex. Fr., in the Green Mountains of Vermont. Pines and spruces in Wisconsin's forest tree nurseries were affected by Cylindrocladium root rot, *Cylindrocladium scoparium* (Morgan). Jack pine stands in the southern and central parts of Wisconsin were commonly infected by the needlecast, *Davisomycella (Hypodermella) ampla* (Dav.) Dark. In Minnesota and along the coast of Maine, dwarf Mistletoe, *Arceuthobium* spp., caused severe damage in localized areas. Present control practice is limited to burning slash after harvest or salvage cut. Brown spot needle blight, *Lecanosticta acicola* (Theum.) Syd., a problem with Christmas tree growers appears static in Wisconsin; fungicide sprays were applied. Infection by *Puccinia spp.*, causing a leaf rust on ash, resulted in serious defoliation for the third year in Maine and New Hampshire. A needle rust of balsam fir caused by *Uredinopsis* spp. was present in Christmas tree plantings in Vermont and New Hampshire. Salt damage was especially severe on hemlock, pine, spruce and some maple and birch throughout the Northeastern Area.

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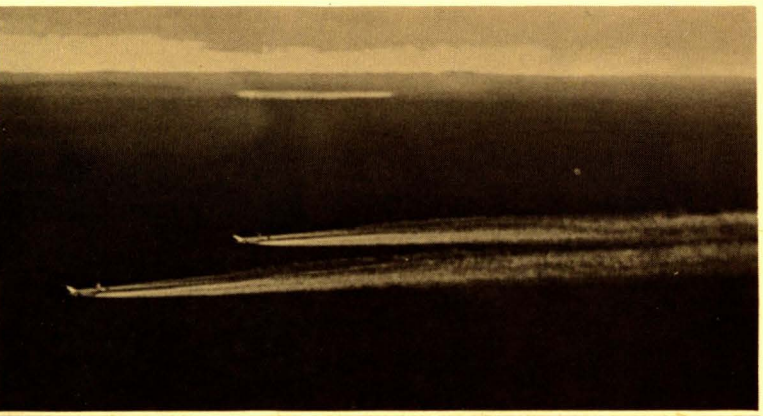
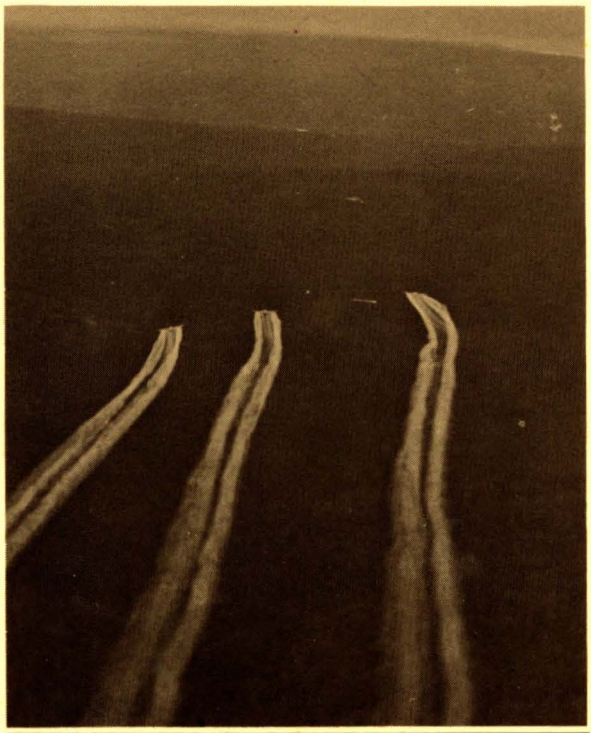


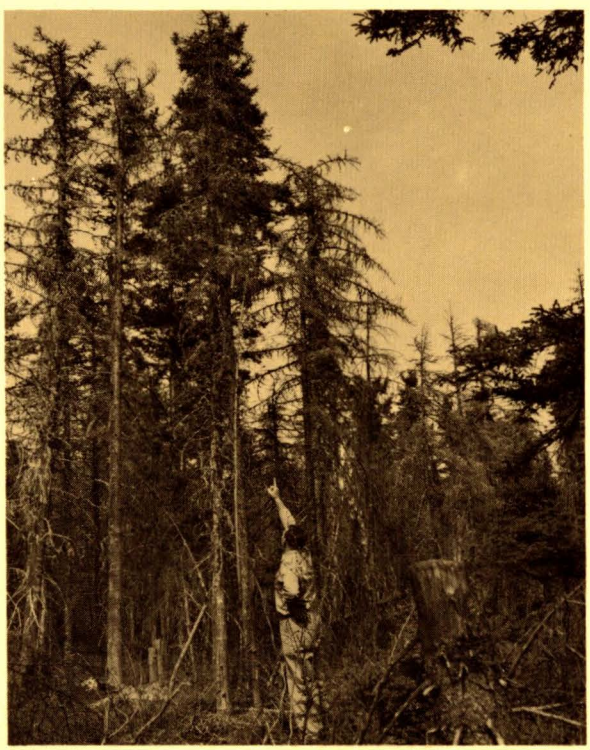
Actual spray operation of Spruce Budworm in Maine.



Aerial operation of Spruce Budworm in Maine – 1973.

Spray planes at Presque Island Airport, Maine – 1973.

Cholesterial analysis of blood samples during spruce budworm spray operation.



Spruce Budworm killing – unsprayed area.

Forest Insect Lab Sault Ste. Marie, K. M. Andresen